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the process of drawing is simple. My usual method is in the case of bisymmetrical insects to measure carefully with a pair of good dividers the length of the insect, transferring the measurements to a piece of paper, and drawing a straight line between the two end points. Then measure the length and breadth of every part of half of the insect, and locate these points on one side of the line. When the outline of half the insect is satisfactory, trace it, straight line included, on the transfer paper. Now reverse the transfer paper, placing the traced outline on the opposite side of the straight line, and rub over it with some hard point,—the point of a lead pencil, for instance. Remove the transfer paper, and the outline of the whole insect appears. This completed outline is then transferred by means of tracing paper to the special process stipple paper, and the drawing proper is made with the wax crayon. Pen and ink is used occasionally to indicate fine hairs, etc. Many beginners make outlines in ink, where simple crayon outlines would be better. It is important to keep the black and white points distinct, not blending them by rubbing."

To this it may be added that all drawings should be reduced about one-third or one-fourth, *i. e.*, to two-thirds or three-fourths the size of the drawing. The engraving should be done by a good establishment. It does not pay to have the cheap processes of zinc-etching, etc., tried on good drawings. Many engraving establishments return soft metal cuts, in which case they should be saved as originals and electrotypes made from them.—C. M. W.

PSYCHOLOGY.

Jastrow on a Writing Test.—In a paper entitled "A Study in Mental Statistics," Prof. Jastrow describes the results of a mental test in which fifty students of a class in psychology, at the University of Wisconsin (twenty-five men and twenty-five women), took part. The task consisted in writing 100 words as rapidly as possible. The material thus collected was utilized to shed light upon (1) the similarity of our ideas and habits of thought, (2) the links that bind our ideas together, and (3) the time required for these processes.

(1) The general tendency to regard one's mental habits and products as singular and original, and consequently to look upon every evidence of similarity of thought as a strange coincidence, receives a set-back from the result of the present and similar studies, for it is found that

these fifty persons, independently writing one hundred words from the many thousand with which they are acquainted, all in all, select from the same 2,024; *i.e.*, of the five thousand words written only 2,024 are different. Again, 1266 words occur but once in the aggregate lists, and omitting these we find that about three thousand of the words are formed by the repetition of only 758 words. Passing to an analysis of this "mental community," it becomes clear that it is greatest at the beginning of the list, and becomes less towards the end; *i.e.*, the habit is to write first the most common, and when these are exhausted, the more unusual words. A very interesting point is the comparison of men and women in their tendency to repeat one another's thoughts. The evidence is unmistakable that the lists of words drawn up by the women are much more like one another than are those written by the men. The women use only 1,123 different words, the men 1,376; the women write but 520 words that occur but once in the lists, the men write 746 such words.

(2) A study of the processes involved in these lists bases itself upon a careful analysis of the ideas therein represented. The relative sizes of such classes, in a measure, indicate the prominence of different classes of objects in the minds of the writers. It may be interesting to mention that the five best represented classes (of the twenty-five adopted in the paper) are "Names of Animals," "Articles of Dress," "Proper Names," "Actions," "Implements and Utensils." The sexes present characteristic preferences for the various classes. The women contribute most largely to "Articles of Dress," writing 224 such words, while the men write but 129; they show an equal favoritism for "Articles of Food," writing 179 such words to but 53 for the men. The men, on the other hand, show fondness for "Implements and Utensils," "Names of Animals," "Professions," "Abstract Terms," etc.

Of the various links by which the one word suggests its successor, it may suffice to indicate as prominent types, (*a*) association by sound, in which words are rhymed, or begin with the same letter; (*b*) by belonging to the same class, as when a series of animals or articles of dress is formed; and (*c*) by more general but not briefly describable relations. One may combine the two inquiries (1) and (2) to ask how often the same word is associated with the same word in different lists. If we take the twenty words most frequently occurring, we find over 500 mentions; and if we examine in each case the word preceding the given word we find it to be the same in 111 cases, and the succeeding word the same in 145 cases,—certainly a remarkable

result. Here, again, the women are found to repeat one another more than the men.

(3) Regarding the time occupied in the process the result reached is that (roughly speaking) it takes on the average 308 seconds to write such a list of 100 words; that 210 seconds are consumed in the mere act of writing, 114 seconds in thinking of what to write, and 16 seconds in which both may be done.

These results are offered, in addition to whatever value they may possess, as an illustration of how, by simple experimental methods, we may become more intimate with the processes that we constantly but unconsciously perform.

ANTHROPOLOGY AND PREHISTORIC ARCHÆOLOGY.¹

Anthropology of the American Association for the Advancement of Science, at Indianapolis.—The American Association for the Advancement of Science held its thirty-ninth meeting at Indianapolis, Indiana, beginning on Tuesday, August 19th, 1890, and continuing ten days. The meetings were held in the new State House, where were also the offices of the Local Committee and Permanent Secretary. This meeting was the fiftieth anniversary of the organization of the Association of Geologists and Naturalists, the parent of the A. A. A. S., which added greatly to its interest. Indianapolis, with its wide, well-shaded streets, its large, comfortable hotels, and the unusual accommodations afforded by which all the sections could meet in large halls under one roof, made this the most important meeting ever held in the West. The Local Committee are to be commended for their admirable arrangements for the comfort of the large number of members and their friends.

The department of Anthropology held its meetings in the Hall of Representatives, with Dr. Frank Baker, of Washington, D. C., as president, and Prof. Joseph Jastrow, of the University of Wisconsin, as secretary.

The address of the President of the Section was listened to with much attention, and created much interest. Dr. Baker is professor in the Medical College of the Georgetown University, lecturing on human anatomy, and is well qualified to speak as he did upon the "Ascent of Man." His arguments were in favor of the theory of

¹ This section is edited by Dr. Thomas Wilson, of the U. S. National Museum.